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Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (Civil Engineering) (2012 to 2017) (Sem.-5)

DESIGN OF STEEL STRUCTURES-I

Subject Code : BTCE-501

M.Code : 70512

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**Answer briefly :**

1. Define the terms pitch and gauge distance with respect to the rivets.
2. Draw a neat diagram for double V butt and single bevel butt joint.
3. What do you mean by 'formation of plastic hinge' in beams?
4. What do you mean by Bolt value?
5. Define the term 'leg' in relation to the fillet weld. How it is related to weld size?
6. What is the significance of carbon content in iron?
7. What is the role of Purlins in roof truss?
8. Differentiate between the slab base and gusseted base.
9. What are 'stanchions' and where they are used?
10. Why lacing is provided in the columns?

SECTION-B

11. An equal angle $75 \text{ mm} \times 75 \text{ mm}$ @ 11.0 kg/m is subjected to a load of 180 KN , whose line of action passes through the centroid of the section, which is at 22.2 mm from the heel. This angle is to be welded to a gusset plate. If the size of the weld is to be 8 mm , find the length of the side fillet welds.
12. Calculate the number of bolts required to connect two plates of $120 \text{ mm} \times 8 \text{ mm}$ size in lap joint, to transmit a factored load of 120 KN . Use 12 mm bolts of grade Fe 410. Assume any missing data.
13. Draw a neat sketch for the steel roof truss showing its various components. Also explain any ten of its components.
14. Design a double angle tension member connected on each side of a 12 mm thick gusset plate, to carry a axial factored load of 450 KN . Use 20 mm bolts. Take yield stress of material as 250 N/mm^2 .
15. Write down the steps for the design of laterally supported beams.

SECTION-C

16. A simply supported steel joist with effective span of 5.0 m , carries a uniformly distributed load of 50 KN over its span inclusive of its self weight. The beam is supported laterally throughout. Select a suitable section and check its safety.
17. Design a laced column with two channel sections placed toe to toe of length 10 m to carry axial load of 750 KN . The column is restrained in position but not in direction at both the ends.
18. Design a slab Base for a column ISHB400 @ 77.4 kg/m , with one $300 \times 12 \text{ mm}$ flange plate on each side. The column carries an axial load of 1200 KN . Provide welded connection between column and Base plate.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.